Appendix C

Mine Communication Vendors and Mine Research Agencies

As of March 28, 2006

Please note that this is a ever-evolving document and that the information contained herein is just a snapshot of the information at this point in time. Please contact the company's website for the latest information.

American Mine Research
Address: 12187 North Scenic Highway, P.O. Box 234, Rocky Gap, VA 24366
URL: www.americanmineresearch.com/
Phone: 800-541-5583; 276-928-1712; Fax: 276-928-1814
Email: sales@americanmineresearch.com
Products: Mine monitoring systems, e.g., MC-4000 (gas, conveyors)

AmpControl Pty Ltd
16 Old Punt Road, Tomago, New South Wales, Australia, 2322
URL: www.ampcontrol.com.au
Phone +61 2 4961 9000; FAX: +61 2 4961 9009
Email: Use website form
Products: VoiceCom is an Ampcontrol-designed multi station audio communication system suitable for longwall and conveyor applications in underground coal mines.
Intrinsically Safe (IS) 2000 Telephone is approved for use in both Group I and Group IIC hazardous areas and supports additional features such as single push button alarm and high output IS incoming sounder call sounder alert. The system operates as a standard analog telephone system with the Piezo sounders creating the audible ring and the optional alert light flashing when the telephone rings. The dialling technique and use of the telephone is identical to ordinary telephones. The system is fully approved by the Australian Communication Authority (A-Tick), the New South Wales and Queensland Department of Mineral Resources and Quality Assurance Services of Australia. The system has been tested at approved laboratories and is entity approved. The System Barriers carry a rating of Ex (ia) IIC TAMB = 45OC and the Telephone is rated Ex (ia) I/IIC T4 IP55.

Appalachian Electronic Instruments, Inc.
Address: P.O. Box 518, Ronceverte, WV 24970
URL: www.aei-wv.com
Phone: 304-647-5855; Fax: 304-645-4006
E-Mail: jwarren@aei-wv.com
Products: Digital methane monitor (102, 202A) on a continuous miner

Austdac
Address:Unit 1, 4 Packard Ave., Castle Hill, NSW 2154 Australia
URL: www.austdac.com.au
Phone: +61 (2) 8851-5000; Fax: +61 (2) 9899-2490

E-mail: austdac.nsw@austdac.com.au
Products: Voice communications & mine monitoring; IS mine telephone, VHF leaky feeder radio system, GIIIR radio cap lamps, LAN, fiber optic; Clearcomm communications and conveyor signaling.

Baldwin & Francis (Electrical)
Address: President Park, President Way, Sheffield S4 7UR
URL: www.baldwinandfrancis.com
Phone: +44 (0)114 2866000
E-Mail: minsales@baldwinandfrancis.com
Products: Mining automation and control (ISPLC), individual automation of surface and underground items of plant, eg. conveyors, face equipment, and electrical distribution using Intrinsically Safe Programmable Logic Controllers (ISPLC) or underground pc's to complete Minewide Control and Monitoring Systems.

Becker Mining Systems GmbH
Address: Barbarastrasse 3, 66299 Friedrichsthal, Germany
URL: www.becker-mining.com
Phone: +49 6897-857-0; Fax: +49 6897-857-188
E-Mail: info@becker-mining.com
Products: BeckerCom Leaky feeder; radio communication; Tagging Tracking
The system by Becker is used in all German UG coal mines, primarily as safety device. The low-frequency tag can be used to locate a trapped miner behind a roof fall for about 100 ft. Battery life is 2 years, belt tag is IS. Similar Becker systems working in VHF/UHF range are used in South Africa to track miners (in caplamp). Tracking is integrated with payroll. Also used to track materials and vehicles.

Cattron-Theimeg Canada Ltd.
Address: 150 Armstrong Ave. Units 5&6, Georgetown, Ontario L7G 5G8
URL: www.cattron-theimeg.com/csa/miningapps.html
Phone: 905-873-9440; Fax 905-873-9449
E-Mail: salescdn@cattron-theimeg.com
Products: SIAMtec remote, automation & communication; teleremote controls; CM1000 radio remote

Comtrol International
Address: 500 Pennsylvania Ave., Irwin, PA 15642
URL: http://www.comtrol-corp.com/
Phone: 724-864-3800; Fax: 724-865-9358
E-mail: sales@comtrol-corp.com
Products: Loudspeaking telephones; Motormouth Trolley Radio MSHA IS; Mine Hoist Communications

Con-Space Communications
Address: 505-5600 Parkwood Way, Richmond, BC, Canada V6V 2M2
URL: www.con-space.com

Phone: 800-546-3405; 604-244-9323
E-mail: sales@con-space.com
Products: Two-way voice communication devices for hazardous environments - used in Quecreek and rescue teams (FEMA, fire dept., etc.) in North America, UK, and Australia

Conspec Controls Inc.
Address: 6 Guttman Boulevard, Charleroi, PA 15022
URL: www.conspec-controls.com
Phone: 800-487-8450; 724-489-8450; Fax: 724-489-9772
E-mail: sales.usa@conspec-controls.com
Products: Medium frequency underground radio communication system, Fiber Optic Trunk Extender; DatHighway Communications; IS Barriers; CO,CH4, CO-Smoke; Modbus Comm Processor; Data Acquisition

CSE Corp. (U.S. Distributor for Mine Site Technologies)
Address: 600 Seco Drive, Monroeville, PA 15146
URL: www.csecorporation.com
Phone: 800-245-2224; 412-856-9200
E-mail: : cre@csecorporation.com
Products: PED, Safety mine equipment – portable gas detection and breathing apparatus, multi-gas monitor

CSIR
Address: S. Africa
URL: www.csir.co.za
Phone: + 27 12 841 2911; Fax: +27 12 349 1153
E-mail: webmaster@csir.co.za
Products: Radio transmitter in cap lamp can be used to locate trapped miner using a portable search unit. Can detect a miner through 30 m of rock

CSIRO
Address: CSIRO Enquiries, Bag 10, Clayton South VIC 3169, Australia
URL: www.dem.csiro.au
Phone: 07 3212 4561; +61 3 9545 2176; Fax: +61 3 9545 2175
E-mail: Enquiries@csiro.au
Products: LAMPS Location and Monitoring for Personal Safety Systems, supplied by www.minecom.com.au

DAC – See GAI-Tronics Corp.

Davis Derby Ltd.
Address: Chequers Lane, Derby DE21 6AW, England
URL: www.davisderby.com
Phone: +44 (0)1332-227500; Fax: +44 (0)1332-372190
E-mail: info@davisderby.com

Products: Phones, DIS 5, PC 21 monitoring, RFID, electronic control & monitoring for harsh, hazardous, & difficult environments

Department of Energy (Office of Industrial Technologies Clearinghouse)
Address: Energy Efficiency and Renewable Energy, U.S. Dept. of Energy, Washington, D.C. 20585
URL: www.oit.doe.gov/mining
Phone: 800-862-2086; Fax 360-586-8303
E-mail: clearinghouse@ee.doe.gov
Products: High Temperature Superconductors (SQUIDS) in UG Communication
www.eere.energy.gov/industry/mining/pdfs/communications.pdf

Draeger Safety Inc.
Address: 101 Technology Drive, Pittsburgh, PA, 15275-1057
URL: www.draeger.com
Phone: 412-787-8383; 800-922-5518 MB# 511
E-mail: chris.melvin@draeger.com
Products: Rescue team face mask communications, PSS Merlin, gas monitoring

Echelon Corporation
Address: 550 Meridian Ave., San Jose, CA 95126
URL: www.echelon.com
Phone: 800-324-3566; 408-938-5200; Fax: 408-790-3800
E-mail: sales@echelon.com
Products: LonWorks Networking, Pyxos Platform; iLON 100 e3

Ekahau
Address: 1851 Alexander Bell Drive, Suite 150, Reston, VA 20191
URL: www.ekahau.com
Phone: 866-4EKAHAU; Fax: 1-703-860-2028
E-mail: sales-americas@ekahau.com
Products: Wireless real-time location and tracking system with WiFi Tags (T201)
Used in tunnels and mine sites, tunnel work in Leon , Spain (25 km long)

El-Equip Inc. (owned by Mine Radio Systems)
Address: 117 Ringwood Drive, Unit #4, Stouffville, Ontario, Canada P3E 5S8
URL: www.el-equip.com
Phone: 905-640-1839; Fax: 905-640-1649
E-mail: el-equip@mineradio.com
Products: MultiCOM (broadband cable, 4.5 MHz bandwidth, 32 channels voice/data, 16 channels video), leaky feeder, Voice/Video/Data/personnel tracking
U.S. Mining Installations: Yes
Foreign Mining Installations: Canada, S Africa, India,Venezuela, Peru, Mexico, Honduras, Poland, Brazil,Nicaragua, China, Korea, Spain, Chile, Russia
MSHA approval (IS or XP): yes
Other Approvals: MOSCertium, ERTL, MA, EXPLOLABS

Other Features and Protocols:
WaveLynx, TTE cap lamp receiver – 300 foot diameter loop antenna on surface

Embigence GmbH
Address: Goethestrasse 52, D-49549 Ladbergen, Germany
URL: www.embigence.com
Phone: +49 5485 8301 42; Fax: +49 5485 8301 58
E-mail: info@embigence.com
Products: Wired and wireless integrated mine networking (WLAN, VoIP),
IREDES - "International Rock Excavation Data Exchange Standard" covers all data flow
required for the manual and automated operation of rock excavation equipment such as drill rigs,
load-haul-dump vehicles or explosives handling.

Falcon Group, LLC
Address: Las Vegas, NM 87701
URL: www.falcongroupllc.com
Phone: 505-454-9620; Fax 505-454-1254 (Allen L. Witters)
E-mail: alw@falcongroupllc.com
Products: Mine Rescue System (beacons), TTE ultrasonic, electromagnetic GPS

Faser S.A.
Address: Nakielska Rd. 42/44, 42-600 Tarnowskie Góry Poland
URL: http://www.faser.com.pl/eng
Phone: (+48 32) 285 07 77; (+48 32) 285 04 40: Fax: +48 32 285 34 13
E-mail: ossowska@faser.com.pl
Products: GLON-GLOP - Polish tracer system for locating of persons trapped in a rock-fall
Factory of rescue equipment and miners' lamps; see also abstract by Kajdasz Z. & Wanat K.
www.tkk.fi/events/icamc2001/abstracts.html

FHF Bergbautechnik GmbH & Co. KG
Address: D-42551 Velbert, Eintrachtstrasse 95, Germany
URL: www.fhf-bt.com
Phone: +49 (0) 20 51 270 – 0; Fax: +49 (0) 20 51 270 – 366
E-mail: info@fhf-bt.de
Products: telephone, radio, mine communications

FlexAlert – See Mine Radio Systems

Gai-tronics (A division of Hubbell Ltd.)
Address: Brunel Drive, Stretton Park, Burton Upon Trent, Staffordshire, DE13 0BZ, UK
URL: www.gai-tronics.co.uk
Phone: 800-492-1212; +44 (0)1283-500500; Fax: +44 (0)1283-500400
E-mail: sales@gai-tronics.co.uk

Products: Auteldac 101 and 102 IS telephones, Femco and Mine Dial/Page Telephone, trolley phones, radios, repeaters
Supplied by United Central Industrial Supply - www.unitedcentral.net/
Other Approvals: En50 014/020 IS and Div 2

Gamma Services International, Inc. (see also Geosteering Mining Services, LLC)
Address: 656 Hall Street, P.O. Box 306, Clay, KY 42404
URL: http://gsimining.com
Phone: 270-664-2262; Cell: 270-635-0482 (Dwayne Towery)
E-mail: dwayne@gsimining.com
Products: TramGuard Proximity Warning System: http://gsimining.com/tramguard.htm
TG MinerTrack: http://gsimining.com/TGminertrack.htm
Note: This system was tested by MSHA

Geosteering Mining Services, LLC (See also Gamma Services International, Inc.)
Address: 1769 Jeff Road Northwest #B, Huntsville, AL 35806-1042
URL: http://www.gsimining.com/
Phone: 256-830-1332; 256-830-2008; Cell 256-651-8229 (Larry D. Frederick)
E-mail: geosteering@aol.com
Products: TramGuard Proximity Warning System: http://gsimining.com/tramguard.htm
TG MinerTrack: http://gsimining.com/TGminertrack.htm
Note: This system was tested by MSHA

GLON-GLOP – (See Faser S.A.)

Grace Industries, Inc.
Address: 305 Bend Hill Road, Fredonia, PA 16124
URL: www.graceindustries.com/index.html
Phone: 800-969-6933, 724-962-9231; Fax: 724-962-3611
E-mail: lshifflett@gracesales.com
Products: GEM system - RFID for firefighters (spread spectrum) – not TTE
         now being tested for coal miners - tested at Bruceton over 1500 ft with repeater
Other Approvals: NFPA 1982

Grintek Mining Electronics (Now SAAB Grintek)
Address: Highveld Techno Park, P.O. Box 8792, Centurion 0046, South Africa
URL: www.grintek.com
Phone: +27 12 672-8300; Fax: +27 12 672-8301
E-mail: info@grintek.com
Products: Continuous miner online monitoring system
http://www.grintek.com/News_dbase/newsview.asp?id=125
CCS3000 Slack rope shaft monitoring system

Grinaker System Technologies
Address: 13 De Havilland, Persequor Park, Pretoria, South Africa
URL: Unknown
Phone: +27 12 348-9626; Fax: +27 12 349-1308
E-mail: Unknown
Products: Telecommunications, Through rock communication
Develop Trapped Miner Location System and an adequate Rescue Strategy
http://www.simrac.co.za/report/Reports/thrust9/gen502/gen502.htm

Hard-Line
Address: 53 Main St., Box 908, Dowling, Ontario, Canada P0M 1R0
URL: www.hard-line.com
Phone: 705-855-1310; Fax: 705-855-9463
E-Mail: sales@hard-line.com
Products: VoIP telephones (Mine Area Net - MAN) – voice, video
2.4 GHz Muckmaster teleoperated system to control any LHD
U.S. Mining Installations: yes - Placer Dome (wireless video with remote control)
Foreign Mining Installations: Canada, Peru
MSHA approval (IS or XP): Unknown
Other Approvals: Industry Certified (Canada)

Hughes Supply Company
Addresss: 130 Center Street, Pax, WV 25904
URL: Coming soon: www.HughesSupplyCompany.com
Phone: 304-877-5780
E-mail: info@HughesSupplyCompany.com
Products: Tunnel Radio, UltraComm - wireless VHF, leaky feeder VHF, trolley phones,
longwall phones
U.S. Mining Installations: one underground mine in TN
Foreign Mining Installations: Unknown
MSHA approval (IS or XP): UltraComm
Other Approvals: Unknown

IMC - (See also Rock Mechanics Technology)
Address: United Kingdom
URL: www.imcgroup.co.uk/mining.htm#Health
Phone: 011-44-1283-553346
E-mail: mining@imcgroup.co.uk
Products: Rescue team medium frequency communications system

Innovative Wireless Technologies
Address: 1047 Vista Park Dr., Suite A, Forest, VA 24551
URL: www.iwtwireless.com
Phone: 434.316.5230; Fax: 434.316.5232
E-mail: Use website form

Products: AXON Transceiver workes with IEEE 802.15.4 specification and is deployed as an ad-hoc mesh network; fixed nodes plus hand-held units. Capable of both wireless data transmission and real-time tracking; voice and text capabilities are planned. Nodes run both Zigbee and Synaptrix (IWT proprietary mesh-networking software stack) 2.4 GHz, 915 MHz, 433 MHz, and UWB modules. Ad-hoc mesh network allows redundant infrastructure to be built. Note: This system was tested by MSHA

iPackets International, Inc
Address: HSBC Building, 885 W. Georgia St., Suite 1200, Box 1020, Vancouver, BC V6C 3E8 Canada
URL: www.ipackets.com
Phone: 778-328-8200; Fax: 604-681-3514
E-mail: sales@ipackets.com
Products: IPMine (wireless VoIP), Wireless Mine Safety Tracking and Monitoring System Based on 802.11 WiFi Hot Spot Employs Cat5 and Fiber backbone
Device worn on miners or on equipment; Voice, data, video

Kenwood USA Corporation
Address: 2201 E. Dominquez Street
URL: www.kenwoodusa.com
Phone: 310-639-9000
E-mail: Use website form
Products: MSHA-approved ProTalk Radio (walkie talkies) – voice up to 32 channels

Kutta Consulting
Address: 2525 Greenway Road
URL: http://www.kuttaconsulting.com
Phone: 602-896-1976
E-mail: customersupport@kuttaconsulting.com
Products: Subterranean Wireless Electronic Communications System (SWECS)
Note: This system was tested by MSHA

Lawrence Livermore National Laboratory (LLNL)
Address: 7000 East Avenue, Livermore CA 94550
URL: www-eng.llnl.gov/uwb_comm/uwb_comm.html
Phone: (925) 423-4234
Email: eng-webmaster@llnl.gov
Products: This is a research organization that is working on ultra-wideband (UWB) radar communications system for military and government applications. UWB radar can provide through the wall communications for voice, video, and data. This technology could have application to communicating with or finding trapped miners.

Marco North America; Marco Systemanalyse und Entwicklung GmbH

Address: 3255 Route 60 East, Ona, WV 25545 USA
URL: www.marco.de
Phone: 304-733-0977 (Larry Murray)
E-mail: sales/E/D/marco/doc/profile1@marco.de
Products: VisorTrac, VoIP phone, Ethernet camera, RFID tracking, voice, wireless, fiber optic
EMP UG telephone – VOIP Ethernet Mine Phone, FiberOptic, Video
PRIM Personal Radio Identification Module MSHA Approved wireless 50 meters 900 MHz
Ethernet Camera, Visor Tag System, Longwall Gateway Phone
977 MHz tracking, voice can be integrated with mine pager system, video
U.S. Mining Installations: tracking used in one Western mine in fresh air
Foreign Mining Installations: Unknown
MSHA approval (IS or XP): Seeking MSHA approvals
Other Approvals: Unknown
Other Features and Protocols: Working with Tunnel Radio to integrate tracking with leaky
feeder

MineCom (see also Pyott-Boone Electronics)
Address: 52 Don Road, Devonport 7310, Tasmania, Australia
URL: www.minecom.com
Phone: 573-364-1356; +61 3 6424 5666; Fax: +61 3 6424 3994
E-mail: sales@minecom.com
Products: MineCom1000/2000/3000, SmartReverse leaky feeder communication system,;
   Tracking: eProx, TelTAG, LAMPS; 2-way radio phone: TERMITE II (meeting IP54, Mil Spec
810R, ISO 9001,Wireless LAN, fiber optics, voice, data, video

Mine Radio Systems (associated with El-Equip)
Address: 117 Ringwood Drive – Unit 5, Stouffville, Canada L4A 8C1
URL: www.mineradio.com
Phone: 905-640-1839
E-mail: usa@mineradio.com
Products: Flex-Com (leaky feeder – 1 MHz bandwidth, 32 channels of voice/data; 16 channels of
video), FlexTag, FlexAlert
"Through-The-Earth" (TTE) emergency evacuation alert system
U.S. Mining Installations: See list in Appendix D
Foreign Mining Installations: Canada, S Africa, Australia, India, Venezuela, Turkey, Peru,
Mexico, Honduras, Poland, Brazil, Nicaragua, China, Korea, Spain, Portugal, UK, Finland,
Switzerland, Chile, Russia
MSHA approval (IS or XP): yes
Other Approvals: MOSCertium, ERTL, MA, EXPLOLABS, ATEX, SIMTARS
Other Features and Protocols: ring feeder redundancy with 2 egress points

Mine-Safe Electronics Inc.
Address: Fifth & Adams St., Sturgis, KY 42459
URL: Unknown

Phone: 502-333-5581; 270-333-5581
E-mail: Unknown
Products: Pager phones, methane monitoring equipment, fire sensing & voice communication equipment; manufacture and repair mine phones

Mine Site Technologies Pty Ltd.
Address: 25-27 Whiting St., Artarmon NWS 2064, Australia
URL: www.minesite.com.au
Phone (US): 412-856-9200 (Chuck Edwards – CSE Corp.); 618-407-5647 (Mike Koesterer)
Phone (AU): +61-2-9437-4399   Fax: +61-2-9437-5688
E-mail: cre@csecorporation.com; m.koesterer@minesite.com.au
mst@minesite.com.au;
Products: PED Through-The-Earth (TTE) communication system, BlastPED blasting control system, Tracker miner tagging system, VDV leaky feeder communications system, Integrated Communications Cap Lamp (ICCL), VHF walkie-talkies using leaky feeder (Motorola HT1000), ImPact WLAN (using WiFi, VOIP, fiber-optic cable).
U.S. Mining Installations: See Appendix C for list of mines and associated technology
Foreign Mining Installations: PED is installed in mines in Australia, Canada, China, and Sweden. Tracker is installed in mines in China and Australia. VDV leaky feeder system is installed in mines in Australia, Canada, Chile, and Mexico.
MSHA approval (IS or XP): Yes for PED system.
Other Approvals: Australia and China
Other Features and Protocols: The Impact WLAN uses a combination of wired (IEEE 802.3) and wireless (IEEE 802.11b) local area network technologies. Video, voice (VoIP), and data communications are possible. Wireless devices are WiFi compliant.

MineSuite
Address: 165 Sth Union Blvd, Suite 900, Lakewood, CO 80228
URL: www.minesuite.com
Phone: 303 763 4919; Fax: 303 763 492
Products: Software and mine monitoring systems – SCADA, PLC

Modular Mining Systems, Inc. (MMSI)
Address: 3289 E. Hemisphere Loop, Tucson, AZ 85706-5028
URL: www.mmsi.com/UG.shtml
Phone: 520-746-9127; Fax: 520-889-5790
E-mail: www.mmsi.com/contact_form.shtml
Products: DISPATCH UG System: uses RF system by others such as leaky feeder or token ring micro cell radios to track location of equipment and transmit instructions from a dispatcher to a screen on equipment.   Does not interfere with voice by others.
Intellimine: High capacity Direct Sequence Spread Spectrum (DSSS) at 2.4 GHz data radio transmission system for surface mine control and automation. Generally LOS limited, would require power infrastructure and repeaters underground. No underground applications at this time.

U.S. Mining Installations: None in coal. Several metal/nonmetal mines including Stillwater, Newmont.
Foreign Mining Installations: Over 150 "Dispatch" systems worldwide.
MSHA approval (IS or XP): No
Other Approvals: No

Nixon Communications
Address:2/38 Lord St., Gladstone 4680, Queensland, Australia
URL: www.nixon.com.au
Phone: Disconnected (?) - (07) 4972 2000; Fax: (07) 4972 2025
E-mail: info@nixon.com.au
Products: Two-way radio and radio repeaters.
U.S. Mining Installations: Not known
Foreign Mining Installations: Australia
MSHA approval (IS or XP): No
Other Approvals:
Queensland Mines Dept. Approval No. 917006X
New South Wales Mines Dept. Approval MDA 10012

Northern Light Technologies (A division of Levitt Safety Ltd.)
Address: 33 Laird Drive, Toronto, Ontario, Canada M4G 3S9
URL: www.nltinc.com ; www.nltdigital.com/
Phone: 416-425-6559; Fax: 416-425-5960
E-mail: sales@nltinc.com
Products:
Digital Network – Ethernet-based wired and wireless network for mining operations that provides backbone for other mining products.
VoIP – two way voice communications system using voice over Internet Protocol and portable handsets.
Digital Messenger – two way messaging and paging system using wireless communications and integrated into cap lamps.
Digital Tracker – vehicle and personnel tracking system using WiFi tags.
U.S. Mining Installations: None yet - Barrick and Newmont mines in Nevada are considering the Digital Network.
Foreign Mining Installations: Australia and Chile
MSHA approval (IS or XP): No, but working on it.
Other Approvals: Not known at this time
Other Features and Protocols: IEEE 802.3, IEEE 802.11b/g

PED – See Mine Site Technologies

Pennine Telcom LTS
Address: Salfor Street, Bury Lancashire, BL9 6YA
URL: http://www.penninetelecom.com
Phone: 0161 763 3333; Fax: 0161 763 3332

E-mail: sales@penninetelecom.com (Simon Walker)
Products: Leaky Feeder System, UHF handheld radios, WLAN equipment. (Resellers of Motorola, Zetron and Tait Communications Equipment).

Poynting Antennas (Pty) Ltd
Address: PO Box 76579, Wendywood, 2144, South Africa
URL: www.poynting.co.za
Phone: +27 11 262-5155; Fax: +27 11 262-5156
E-mail: sales@poynting.co.za
Products: Integrated Mine Safety System
A consortium consisting of Poynting Innovations, Mine Radio Systems, and CSIR
Miners tag in each miners cap lamp battery
UG communication – locating, tagging, alerting
TTE EM communication technology
GSM 900, GSM 1800, 2.4-2.5GHz helical, circularly polarized, uni-directional and directional antennas and PATCH-A0011 patch antenna components for underground communication systems.
U.S. Mining Installations: The antennas are a component of many communications systems. Specific mines are not known.
Foreign Mining Installations: Australia, South Africa, Canada
MSHA approval (IS or XP): No
Other Approvals: No

Pyott-Boone Electronics (see also MineCom)
Address: 1459 Wittens Mill Road, North Tazewell VA 24630; PO Box 809, Tazewell, VA 24651
URL: http://www.pyottboone.com/main.shtml
Phone: 276-988-5505; Fax: 276-988-6820
E-mail: pboone@pyottboone.com
Products: U.S representative for MineCom Australia (leaky feeder, Wireless LAN, fiber optics, tracking), Pager phones, monitoring & control. MineCom systems use one of 2.5Mhz bandwidth VHF Analog, 10Mhz bandwidth UHF Analog , 800-900 Mhz and 2.4 Ghz over leaky feeder system with down the line (leaky feeder) or externally (Fiber) powered amplifiers, no battery back-up. Can transmit voice, data (SCADA) and video over same systems and can track miners by area using RF tags monitored by devices connected to the system. In the event of damage to the leaky feeder cable, communication and tracking beyond the last intact amplifier is lost. The tracking system retains function for 8 hours and will upload information collected while isolated if communication is restored within 8 hrs. Pyott Boone has long represented "Page Boss" pager phones that use a pair of wires including small handhelds. Also has lines of atmospheric and equipment monitoring systems using hard wire or fiber optic connections.
U.S. Mining Installations: Extensive use of Page Boss and monitoring systems. MineCom is a recent acquisition and P-B has no information on pre-existing US installations.
Foreign Mining Installations: Australia, Canada, Indonesia
MSHA approval (IS or XP):   Pager Phones are IS, & state of PA approved. No MineCom products have MSHA approvals.

Other Approvals: MinCom hand held radios have IP-54 & MILSTD810E approvals. Some amplifiers have AU IS rating.

Q-Track Corporation
Address: 515 Sparkman Drive NW, Huntsville, AL 35816
URL: www.q-track.com
Phone: 256-489-0075; Fax: 256-704-6002
E-mail: info@q-track.com
Products: NFER Miner Tracking System, Quick-Start (concept product for structural fire fighters under development) Location only, no communications. NFER uses 1MHz RF signal and measures the phase angle of the electric and magnetic waves. Location is determined by triangulation between receivers and subject.
Maximum range from transmitter to receiver is ~600 ft LOS (1/2 wavelength). Accuracy is +/- 0.5%.
Receivers require power and communication link to processing location, could deploy in an emergency if integration with a RF communications system for data link is developed. Could be used to locate miners in a general area as a hand-held stand alone system.
U.S. Mining Installations: None - Concept Only
Foreign Mining Installations: None - Concept Only
MSHA approval (IS or XP): No
Other Approvals: No

Radiocontact Ltd.
Address: 37 Montgomery Rd., Castelreagh Ind. Est. Belfast BT6 9HL, UK
URL: http://www.radcon.com/
Phone: +44 (0) 28 9040 1742; Fax: +44 (0) 28 9040 1746
E-mail: info@radcon.com
Products: Leaky feeder fence security system, wireless video and audio transmission systems, security systems and access control.

Rajant
Address: 400 East King Street, Malvern, PA 19355
URL: http://www.rajant.com
Phone: Barry McElroy, (484) 595-0233; Fax: (484) 595-0244
E-mail: JWASHINGTON@RAJANT.COM
Products: BreadCrumb System
Note: This system was tested by MSHA

Raton Technology Research (See also Stolar Horizon)
Address: 828 Clayton Highway, Raton, NM 87740
URL: www.stolarhorizon.com
Phone: 505-445-3607; Fax 505-445-9659
E-mail: stolar@stolarhorizon.com
Products: Through-The-Earth (TTE) high-temperature superconductor SQUID receiver

No communications systems are offered, but they have been involved in through-the-earth communications system research using high-temperature superconductors in receivers. The technology was not commercialized.

Rel-Tek
Address: 610 Beatty Road, Monroeville, PA 15146
URL: www.rel-tek.com
Phone: 412-373-6700
E-mail: sales@rel-tek.com
Products: Mine Atmospheric monitoring systems for carbon monoxide and other toxics, methane and all combustibles, oxygen(% and PPM), carbon dioxide, NO2, SO2, H2S, smoke, temp, pressure, RH and air velocity. No voice, digital data, or text capability. 10-mile communications limit over twisted pair cable.
U.S. Mining Installations: Not available
Foreign Mining Installations: Not available
MSHA approval (IS or XP):
MSHA approved IS Power Circuit Barriers, 120VAC input, 28VDC output, 1, 2 & 4A
Other Approvals: IS Class 1, Div 1-2
Other Features and Protocols: 4-20 ma signal.

RIMTech - See Conspec Controls Inc.

Rock Mechanics Technology Ltd. (Part of IMC)
Address: Bretby Business Park, Ashby Road, Stanhope Bretby, Burton-on-Trent, Staffordshire DE15 0QD
URL: www.rmtltd.com/m_comm_page_1.htm
Phone: +44 (0) 1283 522201; Fax: +44 (0) 1283 522279
E-mail: rmt@rmtltd.com
Products: m-Comm - rescue communications system that uses a single conductor wire to transmit voice to handheld radios that couple to the wire inductively. The wire is deployed as rescue personnel advance into the mine.
U.S. Mining Installations: Twenty Mile Coal, Colorado.
Foreign Mining Installations: U.K., Iran, Sardinia (Italy), Norway
MSHA approval (IS or XP): Yes
Other Approvals:
Ex II 1 G, Ex I M1, EEx ia II C T1/T4, UL, CSA
Other Features and Protocols:

SIAM (See Cattron-Theimeg)
Address: 150 Armstrong Ave., Units 5&6, Georgetown, Ontario L7G 5G8
URL: www.mine.stas.ca, also www.siamtec.com
Phone: 905-873-9440; Fax 905-873-9449
E-mail: salescdn@cattron-theimeg.com
Products: SIAMremote II, SIAMautomated, SIAMnet, SIAMvvm

Selectronic International Service (SIS) GmbH (See also VAK)
Address: Berliner Strasse 109, Werder (havel), 14542, Germany
URL: http://www.lionwings.de/cms/
Phone: +49 (0) 3327 56636; Fax: +49 (0) 3327 56637
E-mail: http://www.worldsecurity-index.com/details.php?id=293
Products: SIRIUS person location system (PLS) - detects a person buried in rubble by detecting breathing or heart beats using non-contact, ground-penetrating, electromagnetic waves.
OMEGA rescue personnel monitoring system – radio tags are worn by rescue workers which communicate to a central command station. An alarm is sounded when a worker is injured or not moving. Used in combination with SIRIUS PLS.
PKB - System for the location of trapped miners wearing a transmitting tag that is located using a directional antenna. Signal can be detected through 15 m of rubble/rock to an accuracy of 5 cm. (1986 - Commercially available trapped miner location system; 1991 – mandatory for German miners to carry tags for locating miners in mine emergencies)

SMC Electrical Products
Address: 6072 Ohio River Road, Huntington, WV 25702; PO Box 880, Barboursville, WV 25504
URL: www.smcelectrical.com/
Phone: 304-736-8933; Fax: 304-736-4541
E-mail: smcmain@smcelectrical.com
Products: Ethernet and fiber optic cable backbone data transmission, face (shield controls) to surface. No voice capability at this time other than IS hard wired pager phones on longwall face.
U.S. Mining Installations: Approximately half the US longwall faces (they share the market with Line Power)
Foreign Mining Installations: Canada, Mexico, China
MSHA approval (IS or XP): MSHA IS and XP depending on component and location.
Other Approvals: Not known at this time
Other Features and Protocols: Longwall face press-to-speak IS pager phones, integrated into lighting and lockout control package.

STAS Ltd. (Now acquired by Cattron-Theimeg)

Stolar Horizon (See also Raton Technology Research)
Address: 828 Clayton Highway, Raton, NM 87740
URL: www.stolarhorizon.com
Phone: 505-445-3607; Fax 505-445-9659
E-mail: stolar@stolarhorizon.com
Products: Void detection system; RIM (radio imaging method) for imaging of coal seams. No communications technologies are offered, but they have been involved in the development of through-the-earth communications and medium frequency radio that uses signal propagation along conductors.

Thunderbird Pacific Radio
Address: 17090 Avondale Way, Redmond, WA 98052
URL: http://www.tbirdpac.com

Phone: 425-869-2727
E-mail: mining@tbirdpac.com
Products: Integrated mining systems for surface mining & communications

Time Domain/Concurrent Technologies Corp.
Address: Cummings Research Park
URL: http://www.timedomain.com
Phone: 256-922-9229
Products: UWB radio
Note: This system was tested by MSHA

Transtek, Inc. (associated with Victor Products)
Address: 200 Vrick Lane, Monroeville, PA 15146
URL: www.transtekcorp.com
Phone: 412-799-0315; Fax: 412-799-0316 (Hal Walls)
E-mail: halwalls@transtekcorp.com
Products: Communications in transmission limited environments
ResQComm – Rescue team communications 1000 foot life line and walkie talkies
TeleMag, ComCell, Unitrans
Wireless Telemetery Communication System
Through-The-Earth (TTE) both ways, but not portable nor MSHA approved
Note: This system was tested by MSHA

Tunnel Radio of America, Inc.
Address: 33868 Eastgate Circle SE Corvallis, OR 97333
URL : www.tunnelradio.com
Phone: 541-758-5637; Fax: 541-758-1417
E-mail: trsales@tunnelradio.com
Products: UltraComm Leaky feeder

United Central Industrial Supply
Address: 1005 Glenway Avenue, Suite 4, P.O. Box 8300, Bristol, VA 24203-8300
URL: www.unitedcentral.net
Phone: 276-466-0511
E-mail: Use website form
Products: Representative of many mine products

University of Innsbruck – Austria
   Institute for Advanced Physics
Address: Christoph-Probst-Platz, Innrain 52, 6020 Innsbruck
URL: www.uibk.ac.at/index-en.html
Phone: +43(0)512/507-2591
E-mail: public-relations@uibk.ac.at

Product: Development of a prototype beacon in miner's cap lamp for trapped miner locating via a handheld receiver

VAK Technical Solutions
Address: 12 Stamperboom Str., Weltevreden Park 1715, Johannesburg, South Africa
URL1: www.selectronic-funk.de/html/suedafrika.html
URL2: www.csir.co.za/websource/ptl0002/pdf_files/news/2005/31system.pdf
Phone: Unknown
E-mail: vkononov@vak.co.za
Products: CWS 500 Collision Warning System: Tested in April 2005 in France on a Caterpillar 773B truck
Working with Selectronic; Working with DSK – RF material tracking

Varis Mine Technology Ltd.
Address: 22 Brady Street, Unit 4, Sudbury, Ontario, Canada P3E 6E1
URL: www.varismine.com
Phone: 877-658-2747; 705-674-8111; Fax: 705-674-7834
E-mail: info@varismine.com
Products: SmartCom – MSHA IS, VHF Ethernet Leaky feeder 30 meter radio coverage voice, data, video, VOIP, SmartTag – tracking, REX Emergency Communication System, SmartLamp

Victor Products
Address: New York Way, New York Ind. Park, Newcastlr Upon Tyne, NE 27 0QF, England
URL: www.victor.co.uk/ ; www.victor.co.uk/mining/index.htm#
Phone: 724-776-4900; 0191-2808000; Fax: 0191 2808080
E-mail: Use website form
Products: DAC Longwall Communications hardwired programmable signaling and control DAC UG Radio System RFM2000 VHF MSHA IS with two-way repeaters, leaky feeder

Vital Alert
Address: Unknown
URL: http://www.vitalalert.com/
Phone: Unknown
E-mail: http://www.vitalalert.com/contactus.htm
Products: EBN – Emergency Broadcast Network; This network's 2-way voice system has the ability to penetrate the earth to depths of up to a thousand feet. EBN's text messaging system is claimed to penetrate up to 9000 feet.
Canary 2 system - Wireless Through-The-Earth (TTE) emergency communications network – developed out of the Los Alamos National laboratory and licensed to Vital Alert. This is a 2-way, real-time digital voice and data prototype communication system that uses very low frequency (<10 KHz) signals to transmit through the earth. Uses wire-wound high-mu ferrite rod with a semiconductor amplifier. Tested to 400 feet through the earth (maximum range to be determined).

Wholesale Mine Supply L.P.

Address: 39 Blaine Ave, Manor, PA 15665
URL: www.wholesaleminesupply.com
Phone: 47-3813-9153; Fax: 47-3813-9691
E-mail: Use website form
Products: Distributor for mine communications equipment such as Varis, Comtrol, and Kenwood

Wtek AS (Safety Systems)
Address: Skarpengland, 4715 0VREB0
URL: www.wtek.no
Phone: 47-3813-9153; Fax: 47-3813-9691
E-mail: contact@wtek.no
Products: Watcher-ATS 47-3816-5000; RFID tag system using WLAN

Zetron
Address: 12034 – 134th Ct. NE. Redmond, WA 98052; PO Box 97004, Redmond, WA 98073
URL: www.zetron.com
Phone: 425-820-6363; Fax: 425-820-7031
E-mail: Use template on website
Products: UHF Walkie talkies